

109TH CONGRESS
1ST SESSION

H. R. 28

To amend the High-Performance Computing Act of 1991.

IN THE HOUSE OF REPRESENTATIVES

JANUARY 4, 2005

Mrs. BIGGERT (for herself, Mr. DAVIS of Tennessee, and Mr. BOEHLERT)
introduced the following bill; which was referred to the Committee on Science

A BILL

To amend the High-Performance Computing Act of 1991.

1 *Be it enacted by the Senate and House of Representa-*
2 *tives of the United States of America in Congress assembled,*

3 **SECTION 1. SHORT TITLE.**

4 This Act may be cited as the “High-Performance
5 Computing Revitalization Act of 2005”.

6 **SEC. 2. DEFINITIONS.**

7 Section 4 of the High-Performance Computing Act
8 of 1991 (15 U.S.C. 5503) is amended—

9 (1) in paragraph (2), by inserting “and multi-
10 disciplinary teams of researchers” after “high-per-
11 formance computing resources”;

12 (2) in paragraph (3)—

1 (A) by striking “scientific workstations,”;

2 (B) by striking “(including vector super-
3 computers and large scale parallel systems)”;

4 (C) by striking “and applications” and in-
5 serting “applications”; and

6 (D) by inserting “, and the management of
7 large data sets” after “systems software”;

8 (3) in paragraph (4), by striking “packet
9 switched”; and

10 (4) by amending paragraphs (5) and (6) to
11 read as follows:

12 “(5) ‘Program’ means the High-Performance
13 Computing Research and Development Program de-
14 scribed in section 101; and

15 “(6) ‘Program Component Areas’ means the
16 major subject areas under which are grouped related
17 individual projects and activities carried out under
18 the Program.”.

19 **SEC. 3. HIGH-PERFORMANCE COMPUTING RESEARCH AND**
20 **DEVELOPMENT PROGRAM.**

21 Title I of the High-Performance Computing Act of
22 1991 (15 U.S.C. 5511 et seq.) is amended—

23 (1) in the title heading, by striking “**AND**
24 **THE NATIONAL RESEARCH AND EDU-**

**CATION NETWORK” and inserting “RE-
SEARCH AND DEVELOPMENT”;**

(2) in section 101—

(A) the section heading, by striking “**NA-
TIONAL HIGH-PERFORMANCE COM-
PUTING” and inserting “HIGH-PERFORM-
ANCE COMPUTING RESEARCH AND DEVEL-
OPMENT”;**

(B) in subsection (a)—

(i) in the subsection heading, by strik-
ing “NATIONAL HIGH-PERFORMANCE
COMPUTING” and inserting “HIGH-PER-
FORMANCE COMPUTING RESEARCH AND
DEVELOPMENT”;

(ii) by striking paragraphs (1) and (2)
and inserting the following: “(1) The
President shall implement a High-Perform-
ance Computing Research and Develop-
ment Program, which shall—

“(A) provide for long-term basic and applied re-
search on high-performance computing;

“(B) provide for research and development on,
and demonstration of, technologies to advance the
capacity and capabilities of high-performance com-
puting and networking systems;

1 “(C) provide for sustained access by the re-
2 search community in the United States to high-per-
3 formance computing systems that are among the
4 most advanced in the world in terms of performance
5 in solving scientific and engineering problems, in-
6 cluding provision for technical support for users of
7 such systems;

8 “(D) provide for efforts to increase software
9 availability, productivity, capability, security, port-
10 ability, and reliability;

11 “(E) provide for high-performance networks, in-
12 cluding experimental testbed networks, to enable re-
13 search and development on, and demonstration of,
14 advanced applications enabled by such networks;

15 “(F) provide for computational science and en-
16 gineering research on mathematical modeling and al-
17 gorithms for applications in all fields of science and
18 engineering;

19 “(G) provide for the technical support of, and
20 research and development on, high-performance
21 computing systems and software required to address
22 Grand Challenges;

23 “(H) provide for educating and training addi-
24 tional undergraduate and graduate students in soft-
25 ware engineering, computer science, computer and

1 network security, applied mathematics, library and
2 information science, and computational science; and

3 “(I) provide for improving the security of com-
4 puting and networking systems, including Federal
5 systems, including research required to establish se-
6 curity standards and practices for these systems.”;

7 (iii) by redesignating paragraphs (3)
8 and (4) as paragraphs (2) and (3), respec-
9 tively;

10 (iv) in paragraph (2), as so redesign-
11 ated by clause (iii) of this subpara-
12 graph—

13 (I) by striking subparagraph (B);

14 (II) by redesignating subpara-
15 graphs (A) and (C) as subparagraphs
16 (D) and (F), respectively;

17 (III) by inserting before subpara-
18 graph (D), as so redesignated by sub-
19 clause (II) of this clause, the following
20 new subparagraphs:

21 “(A) establish the goals and priorities for Fed-
22 eral high-performance computing research, develop-
23 ment, networking, and other activities;

24 “(B) establish Program Component Areas that
25 implement the goals established under subparagraph

1 (A), and identify the Grand Challenges that the Pro-
2 gram should address;

3 “(C) provide for interagency coordination of
4 Federal high-performance computing research, devel-
5 opment, networking, and other activities undertaken
6 pursuant to the Program;”; and

7 (IV) by inserting after subparagraph
8 (D), as so redesignated by subclause (II)
9 of this clause, the following new subpara-
10 graph:

11 “(E) develop and maintain a research, develop-
12 ment, and deployment roadmap for the provision of
13 high-performance computing systems under para-
14 graph (1)(C); and”; and

15 (v) in paragraph (3), as so redesign-
16 ated by clause (iii) of this subpara-
17 graph—

18 (I) by striking “paragraph
19 (3)(A)” and inserting “paragraph
20 (2)(D)”;

21 (II) by amending subparagraph
22 (A) to read as follows:

23 “(A) provide a detailed description of the Pro-
24 gram Component Areas, including a description of
25 any changes in the definition of or activities under

1 the Program Component Areas from the preceding
2 report, and the reasons for such changes, and a de-
3 scription of Grand Challenges supported under the
4 Program;”;

5 (III) in subparagraph (C), by
6 striking “specific activities” and all
7 that follows through “the Network”
8 and inserting “each Program Compo-
9 nent Area”;

10 (IV) in subparagraph (D), by in-
11 serting “and for each Program Com-
12 ponent Area” after “participating in
13 the Program”;

14 (V) in subparagraph (D), by
15 striking “applies;” and inserting “ap-
16 plies; and”;

17 (VI) by striking subparagraph
18 (E) and redesignating subparagraph
19 (F) as subparagraph (E); and

20 (VII) in subparagraph (E), as so
21 redesignated by subclause (VI) of this
22 clause, by inserting “and the extent to
23 which the Program incorporates the
24 recommendations of the advisory com-

1 mittee established under subsection
2 (b)” after “for the Program”;

3 (C) in subsection (b)—

4 (i) by redesignating paragraphs (1)
5 through (5) as subparagraphs (A) through
6 (E), respectively;

7 (ii) by inserting “(1)” after “ADVI-
8 SORY COMMITTEE.—”;

9 (iii) in paragraph (1)(C), as so redес-
10 ignated by clauses (i) and (ii) of this sub-
11 paragraph, by inserting “, including fund-
12 ing levels for the Program Component
13 Areas” after “of the Program”;

14 (iv) in paragraph (1)(D), as so redес-
15 ignated by clauses (i) and (ii) of this sub-
16 paragraph, by striking “computing” and
17 inserting “high-performance computing
18 and networking”; and

19 (v) by adding at the end the following
20 new paragraph:

21 “(2) In addition to the duties outlined in paragraph
22 (1), the advisory committee shall conduct periodic evalua-
23 tions of the funding, management, coordination, imple-
24 mentation, and activities of the Program, and shall report
25 not less frequently than once every two fiscal years to the

1 Committee on Science of the House of Representatives
2 and the Committee on Commerce, Science, and Transpor-
3 tation of the Senate on its findings and recommendations.
4 The first report shall be due within one year after the date
5 of enactment of this paragraph.”; and

6 (D) in subsection (c)(1)(A), by striking
7 “Program or” and inserting “Program Compo-
8 nent Areas or”; and
9 (3) by striking sections 102 and 103.

10 **SEC. 4. AGENCY ACTIVITIES.**

11 Title II of the High-Performance Computing Act of
12 1991 (15 U.S.C. 5521 et seq.) is amended—

13 (1) by amending subsection (a) of section 201
14 to read as follows:

15 “(a) GENERAL RESPONSIBILITIES.—As part of the
16 Program described in title I, the National Science Foun-
17 dation shall—

18 “(1) support research and development to gen-
19 erate fundamental scientific and technical knowledge
20 with the potential of advancing high-performance
21 computing and networking systems and their appli-
22 cations;

23 “(2) provide computing and networking infra-
24 structure support to the research community in the
25 United States, including the provision of high-per-

1 formance computing systems that are among the
2 most advanced in the world in terms of performance
3 in solving scientific and engineering problems, and
4 including support for advanced software and applica-
5 tions development, for all science and engineering
6 disciplines; and

7 “(3) support basic research and education in all
8 aspects of high-performance computing and net-
9 working.”;

10 (2) by amending subsection (a) of section 202
11 to read as follows:

12 “(a) GENERAL RESPONSIBILITIES.—As part of the
13 Program described in title I, the National Aeronautics and
14 Space Administration shall conduct basic and applied re-
15 search in high-performance computing and networking,
16 with emphasis on—

17 “(1) computational fluid dynamics, computa-
18 tional thermal dynamics, and computational aero-
19 dynamics;

20 “(2) scientific data dissemination and tools to
21 enable data to be fully analyzed and combined from
22 multiple sources and sensors;

23 “(3) remote exploration and experimentation;
24 and

1 “(4) tools for collaboration in system design,
2 analysis, and testing.”;

3 (3) in section 203—

4 (A) by striking subsections (a) through (d)
5 and inserting the following:

6 “(a) GENERAL RESPONSIBILITIES.—As part of the
7 Program described in title I, the Secretary of Energy
8 shall—

9 “(1) conduct and support basic and applied re-
10 search in high-performance computing and net-
11 working to support fundamental research in science
12 and engineering disciplines related to energy applica-
13 tions; and

14 “(2) provide computing and networking infra-
15 structure support, including the provision of high-
16 performance computing systems that are among the
17 most advanced in the world in terms of performance
18 in solving scientific and engineering problems, and
19 including support for advanced software and applica-
20 tions development, for science and engineering dis-
21 ciplines related to energy applications.”; and

22 (B) by redesignating subsection (e) as sub-
23 section (b);

24 (4) by amending subsection (a) of section 204
25 to read as follows:

1 “(a) GENERAL RESPONSIBILITIES.—As part of the
2 Program described in title I—

3 “(1) the National Institute of Standards and
4 Technology shall—

5 “(A) conduct basic and applied metrology
6 research needed to support high-performance
7 computing and networking systems;

8 “(B) develop benchmark tests and stand-
9 ards for high-performance computing and net-
10 working systems and software;

11 “(C) develop and propose voluntary stand-
12 ards and guidelines, and develop measurement
13 techniques and test methods, for the interoper-
14 ability of high-performance computing systems
15 in networks and for common user interfaces to
16 high-performance computing and networking
17 systems; and

18 “(D) work with industry and others to de-
19 velop, and facilitate the implementation of,
20 high-performance computing applications to
21 solve science and engineering problems that are
22 relevant to industry; and

23 “(2) the National Oceanic and Atmospheric Ad-
24 ministration shall conduct basic and applied research

1 on high-performance computing applications, with
2 emphasis on—

3 “(A) improving weather forecasting and
4 climate prediction;

5 “(B) collection, analysis, and dissemination
6 of environmental information; and

7 “(C) development of more accurate models
8 of the ocean-atmosphere system.”; and

9 (5) by amending subsection (a) of section 205
10 to read as follows:

11 “(a) GENERAL RESPONSIBILITIES.—As part of the
12 Program described in title I, the Environmental Protec-
13 tion Agency shall conduct basic and applied research di-
14 rected toward advancement and dissemination of computa-
15 tional techniques and software tools for high-performance
16 computing systems with an emphasis on modeling to—

17 “(1) develop robust decision support tools;

18 “(2) predict pollutant transport and the effects
19 of pollutants on humans and on ecosystems; and

20 “(3) better understand atmospheric dynamics
21 and chemistry.”.

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